



UNITED STATES DEPARTMENT OF COMMERCE
The Assistant Secretary for Communications
and Information
Washington, D.C. 20230

November 2, 1995

The Honorable Reed Hundt
Chairman
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Re: RM 8648, RM 8653

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Dear Chairman Hundt:

This letter addresses the petitions for rulemaking filed before the Commission in May 1995 by the Wireless Information Networks Forum (WINForum) and Apple Computer Company, Inc.¹ Those petitions request the allocation of certain spectrum in the 5 GHz band and the adoption of service rules for shared nonlicensed personal radio network devices. Both the WINForum Shared Unlicensed Personal Radio Network (SUPERnet) devices and the Apple National Information Infrastructure (NII) Band devices would allow operation of nonlicensed, high-speed, wireless networks with multimedia capabilities. NTIA believes that these new wireless technologies have the potential to enhance education and other community services. Implementation of these networks and the feasibility of spectrum sharing between the proposed devices and Federal users should thus be fully explored by the Commission. We therefore recommend that the Commission proceed with a Notice of Proposed Rulemaking (NPRM) so that the policy and technical issues raised by the petitions may be addressed.

NTIA serves as the principal adviser to the President on telecommunications and information issues, including the Administration's NII and Global Information Infrastructure initiatives. In addition, as Federal spectrum manager, NTIA shares with the Commission jurisdiction over the frequency bands under discussion in the petitions. NTIA believes that the proposed WINForum and Apple devices could provide an important means of nonlicensed wireless access to the NII. Wireless networks can be more affordable than wired networks. Schools, hospitals, businesses, and others would thus have convenient access to communications networks with voice, video, data, and graphics capabilities without the expense and disruption that installing wired systems would require.

¹ Wireless Information Networks Forum Petition for Rulemaking to Allocate the 5.1 - 5.35 GHz Band and Adopt Service Rules for a Shared Unlicensed Personal Radio Network (RM 8648) (filed May 15, 1995); Apple Computer Company, Inc. Petition for Rulemaking to Allocate Spectrum in the 5 GHz Band to Establish a Wireless Component of the National Information Infrastructure (RM 8653) (filed May 24, 1995).

As you know, the President and Vice President have launched an important initiative to connect all of our classrooms, libraries, hospitals, and clinics to the NII by the year 2000. This initiative, which promotes expanded access to computers, teacher training, and the development of compelling educational applications, has the potential to revolutionize our educational system, changing the way teachers teach and students learn. Students will be able to collaborate with their peers around the world, search digital libraries, use remote scientific instruments, and take "field trips" to on-line museums. As President Clinton said in a recent speech, "[e]very child in America deserves the chance to get the high-tech know-how to unlock the promises of the 21st Century."

For this reason, the Administration strongly supports spectrum policies that will promote affordable, high-bandwidth wireless computer networks. Wireless networks, and nonlicensed networks in particular, can be a cost-effective approach for the countless schools in our Nation that need connections to the NII to enhance learning opportunities and provide young Americans with the skills they will need in the future. Wireless networks may be an important option for schools because they often face limited budgets and are prevented from entering the Information Age by inadequate wiring. Furthermore, the proposed devices could allow more students to have network access directly at their desks in their classrooms instead of in computer labs in other rooms.

Other users will benefit from nonlicensed wireless networks as well. Small businesses that lack adequate wiring and that cannot afford access to wired networks could have affordable, convenient wireless access to multimedia networks. Such access could enhance productivity and efficiency. Health care providers would have the ability to transmit patient data, such as x-rays and MRI images, video recordings, medical charts, and other records, which would dramatically improve the efficiency of medical staff and ease the group diagnosis of medical cases. Moreover, NTIA believes nonlicensed wireless components of the NII will provide significant opportunities for innovators and small companies to make contributions to the overall mix of products and services available through the NII.²

NTIA looks forward to addressing a number of policy issues raised by the petitions that require further study. For example, petitioners seek some protection from interference for the wireless devices. Allocating spectrum to these new devices might thus foreclose certain other uses of the spectrum and require the Commission to weigh the public benefits of the proposed devices against those of competing spectrum uses. It may be possible for the Commission to establish a procedure that would guide it toward an economically efficient allocation. We encourage the

² See Letter from Larry Irving, Assistant Secretary of Commerce for Communications and Information, to Reed Hundt, Chairman, Federal Communications Commission, on ET Docket No. 94-32, ET Docket No. 94-124, and PR Docket No. 93-61 (Dec. 12, 1994).

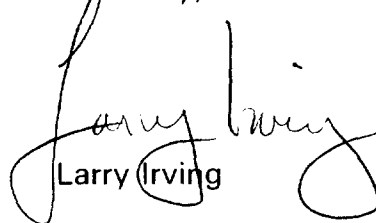
Commission to raise these important issues in any Notice of Proposed Rulemaking it releases.

Because of our role as manager of radio spectrum used by Federal entities, NTIA is also particularly interested in technical issues raised by the petitions -- such as the amount of spectrum needed for the devices, the suitability of the bands proposed for operations, and whether sharing with other services is possible in those bands. Federal agencies such as the Department of Defense and the Federal Aviation Administration currently use spectrum in the bands under discussion. Given the scarcity of spectrum, NTIA believes that Federal entities should share spectrum with others when possible.

NTIA has preliminarily reviewed Federal operations in these bands and determined that careful examination of sharing and compatibility should be conducted in most of the spectrum bands proposed for the new devices, with one important exception: to protect public safety, the 5.0-5.15 GHz band must remain fully available for air traffic control operations. We expect that the new devices could still be accommodated, however, because WINForum's petition involves only the upper portions of this band and Apple's petition involves spectrum adjacent to but not including this band. NTIA's preliminary review of existing and planned systems operating in the bands under discussion is enclosed with this letter.

Thank you for your consideration of these views.

Sincerely,



Larry Irving

Enclosure

cc: The Honorable James H. Quello
The Honorable Andrew C. Barrett
The Honorable Rachelle B. Chong
The Honorable Susan Ness

November 2, 1995

THE NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

**PRELIMINARY TECHNICAL REVIEW OF SPECTRUM MANAGEMENT ASPECTS OF
WINFORUM AND APPLE NONLICENSED NETWORKING DEVICES PROPOSALS**

The Wireless Information Networks Forum (WINForum) and Apple Computer Company, Inc. petitions request allocation of certain spectrum in the 5 GHz band and adoption of service rules for shared nonlicensed personal radio network devices. The WINForum devices would operate in the 5.1-5.35 GHz bands on a shared nonlicensed basis, allowing short-range transmission of digital information at rates of approximately 20 million bits per second. Apple proposes to operate devices in the 5.15-5.30 GHz and 5.725-5.875 GHz bands on a nonlicensed basis and with some protection from interference. The Apple devices would provide not only short-range transmission of digital information at rates of approximately 24 million bits per second, but also medium-range transmissions (possibly up to 10 kilometers away).

As Federal spectrum manager, NTIA shares with the Commission responsibility for the frequency bands under discussion in the petitions and therefore has undertaken this preliminary review of those bands to determine the practicality of considering the bands for allocation for the proposed new devices. In sum, NTIA does not object to careful study of the bands petitioners seek to use to determine whether sharing with current and future users is possible, with one important exception: to protect public safety, the 5.0-5.15 GHz bands must remain fully available for air traffic control operations and sharing with the proposed networks in that band is thus not an option. As stated in our cover letter, we expect that the new devices could still be accommodated, however, because WINForum's petition involves only the upper portions of this band and Apple's petition involves spectrum adjacent to but not including this band. In addition, we question whether the medium-range transmissions proposed only by Apple are practical within the 5 GHz band, although we note that such transmissions may be appropriate in other bands.

5.0-5.25 GHz Band

NTIA believes that consideration of the 5.0-5.15 GHz band for the proposed devices is not feasible due to the need for these bands to remain fully available for air traffic control operations that protect public safety. NTIA does not object, however, to a careful examination of spectrum sharing of wireless devices with current and proposed users in the 5.15-5.25 GHz band.

The 5.0-5.25 GHz band is currently allocated to the aeronautical radionavigation service and was intended to be used principally in the United States and around the world for air traffic control, and specifically, aeronautical

radionavigation systems such as the Microwave Landing System (MLS). The Federal Aviation Administration (FAA) has conducted extensive research and development for the MLS in the 5.0-5.15 GHz portion of the band and has plans for installation of 29 systems. The FAA stated in comments to the Commission that it opposes sharing this band with wireless data communication devices and it believes that wireless devices should not be protected from interference caused by aeronautical systems. As these systems are necessary to protect public safety, the 5.0-5.15 GHz band does not appear at this time to be an appropriate candidate for use by new devices. As noted above, we expect that the new devices could still be accommodated, however, because WINForum's petition involves only the upper portions of this band and Apple's petition involves spectrum adjacent to but not including this band. We also note that the FAA is also considering the 5.15-5.25 portion of the band for future operations of Terminal Doppler Weather Radar (TDWR) and data link applications, including Automatic Dependent Surveillance (ADS), but details of these systems have not been defined and sharing may be possible in these parts of the band.

In addition, the United States will be proposing at the next World Radiocommunication Conference (WRC-95) that a part of the 5.0-5.25 GHz band be reallocated for Mobile Satellite Service (MSS) feederlink (Earth-to-space) operations. In comments to the Commission, MSS licensees Globalstar and Constellation stated that the petitioners fail to offer convincing technical studies to demonstrate that their network devices are compatible with MSS feederlinks that will operate in the 5 GHz band. They also stated that the lack of specific technical parameters for the petitioners' network devices does not allow an adequate review of available bands most suited for high-speed wireless data devices. Assuming the Commission considers these views, NTIA does not object to a careful examination of whether spectrum sharing of wireless devices with current and proposed users in the 5.15-5.25 GHz band is possible.

NTIA also notes that many European countries have allocated parts of the 5.15-5.25 GHz bands for High Performance Radio Local Area Networks (HIPERLANs), which are proposed wireless devices that would operate in a manner similar to the WINForum and Apple devices. Allowing the petitioners' devices to operate in these bands in the United States would allow for the possibility that the devices could be used on both continents. This would be convenient for users and bolster marketing opportunities for manufacturers, making these bands attractive candidates for use by the petitioners' devices.

Some HIPERLANs studies have been conducted that indicate some sharing with current users in these bands may be possible. Thus, if systems similar to HIPERLANs are developed in the United States, sharing may be possible here as well. Results of HIPERLANs versus MSS feederlinks studies contained in the WRC-95 Conference Preparatory Meeting (CPM) Report show that for electromagnetic compatibility, MSS feederlink uplink earth stations require up to a 50 kilometer

separation distance from outdoor HIPERLANs nodes and up to a 10 kilometer separation from indoor nodes. European studies of MLS versus HIPERLANs compatibility indicate that HIPERLANs can operate in channels adjacent to those used by MLS. NTIA is not aware, however, of any co-channel MLS versus HIPERLANs compatibility studies. Further studies must be conducted to determine whether the petitioners' devices could share the spectrum they propose to use.

5.25-5.35 GHz Band

NTIA has concerns about use of the 5.25-5.35 GHz band by nonlicensed wireless devices but does not object to a careful examination of spectrum sharing between wireless devices and current and proposed users in this band.

The 5.25-5.35 GHz band is allocated to the Government radiolocation service (which includes radars used by the Defense Department to track missiles and radars used by the FAA to track aircraft) on a primary basis and to non-Government radiolocation (such as radio surveying devices) on a secondary basis. NTIA believes that, due to the high power and siting constraints of Government radiolocation systems, it may be difficult for wireless devices to share spectrum in proximity with such Government systems in the 5.25-5.35 GHz band. Several alternatives for precluding mutual interference between Government radiolocation systems and wireless devices are possible. Quiet zones could be established around key radiolocation locations within which wireless devices would not be able to operate. If that proves too restrictive or impractical, it might be feasible for wireless devices to be designed with robust modulation schemes that would be resistant to radar generated pulsed-type interference. These types of modulation schemes may also reduce the spectrum requirements for wireless devices.

Furthermore, within the 5.25-5.35 GHz band, footnote 713 allows radiolocation devices onboard spacecraft to operate on a secondary basis for the purpose of earth exploration-satellite and space research services. An International Telecommunication Union Radiocommunication Sector (ITU-R) study group has been established to investigate the consequences of upgrading the earth-exploration satellite and space research services to primary status within this band. Issues concerning the upgrading of these services to a primary status may be addressed at future WRC conferences (i.e., WRC-97).

5.725-5.875 GHz Band

NTIA does not object to a careful examination of spectrum sharing of wireless devices with current and proposed users in the 5.725-5.875 GHz band.

The 5.725-5.850 GHz band is currently allocated to the Government radiolocation service on a primary basis and to amateurs on a secondary basis. In addition, the 5.725-5.875 GHz band has been designated for use by Industrial, Scientific, and Medical (ISM) devices. ISM devices, however, are not operated extensively in this band at this time.

The 5.850-5.875 GHz band is presently allocated to the Government radiolocation service and to the non-Government fixed satellite service (Earth-to-space) on a co-primary basis, with a secondary allocation to amateurs. In addition, this band is used for controlling target vehicles during air defense and air combat training. NTIA has recently proposed through the Interdepartment Radio Advisory Committee (IRAC) that the Government radiolocation service be replaced by a shared Government/non-Government allocation to the fixed satellite service (Earth-to-space). In a report sent to NTIA in response to its 1994 Preliminary Spectrum Reallocation Report, the Commission suggested that the 5.850-5.925 GHz band be allocated solely to the non-Government fixed satellite service. In addition, legislation concerning the reallocation of this band for non-Government use is pending in Congress.

The American Radio Relay League and individual amateur radio operators filed comments with the Commission regarding their concern that a proliferation of wireless devices would negatively affect amateur operations in the 5.8 GHz band. Amateur activity in the bands around 5.8 GHz is relatively light due to the high costs of the associated equipment. As congestion increases in lower frequency bands allocated to the amateurs, however, the use of the bands around 5.8 GHz by amateurs is expected to increase.

When making any new allocations, NTIA believes the Commission should take into consideration the current and planned uses of the 5.725-5.875 GHz bands by ISM, radiolocation, satellite, and amateur services.

Apple's Medium-Range Communications Proposal

Some commenters on the petitions have questioned the practicality and spectrum efficiency of the Apple devices using the 5 GHz band for medium-range point-to-point communications -- i.e., networking that would extend not only within a short range, such as within a building, but also to distances as far as 10 to 15 kilometers away -- and have recommended that other bands above 10 GHz be considered before a commitment is made to a frequency band for wireless devices. NTIA believes that it may be impractical to use the 5 GHz band to support both local area networks and medium-range point-to-point communications. NTIA is also concerned that transmitting data over 10 kilometer distances at high speeds will preclude spectrum sharing among multiple users, including incumbent Federal users.

NTIA supports the goal of grassroots community networks that are affordable and rapidly deployable, however. NTIA believes the Commission should determine whether there are other bands that are more appropriate for this kind of application. Furthermore, the Commission should explore whether streamlining and "reinvention" of the licensing process could foster development of enable low cost, wireless community networks.

CERTIFICATE OF SERVICE

I Cheryl A. Kinsey, do hereby certify that I have this 2nd day of November, 1995 mailed by first class United States mail, postage repaid, copies of the foregoing letter to the parties of record in this proceeding.

Cheryl A. Kinsey
Cheryl A. Kinsey